CLAIMS

1. A method of magnetic measurement of the position and the orientation of a mobile object with respect to a fixed structure, in which a first emitter assembly includes at least two orthogonal coils for emitting magnetic fields, integral with said fixed structure, which define a reference frame, and means of emission for injecting predetermined emission currents into said coils at first frequencies, in which a second sensor assembly includes at least two orthogonal coils for detecting magnetic fields, integral with said mobile object, sensor channels with servocontrol loops for producing in feedback coils coupled to said detection coils feedback magnetic fields by injection of measurement currents and a calibration channel for elaborating at least one calibration voltage, and in which at least one acquisition channel is provided for extracting measurement values of said emission channels, said sensor channels and said calibration channel and means of calculation and of processing estimate, on the basis of said measurement values, the magnetic fields detected in the second sensor assembly and deduce therefrom the position and the orientation of said mobile object in said reference frame, said method being characterized in that said calibration voltage comprises only terms with at least two frequencies distinct from said first frequencies and in that said method comprises a step of injecting calibration currents and voltages into said channels of the sensor so as to produce calibration measurement values identified by their frequency, a step of estimating by the means of calculation the transfer function of each of the sensor channels and a step of deducing by said means of calculation the magnetic fields detected on the

basis of said measurement values and of the inverse of said estimated transfer functions.

2. The method as claimed in claim 1, in which the servocontrol loops of the sensor channels provide output voltages (V_{c1} to V_{c3}) producing said measurement currents and said measurement currents flow through measurement resistors (R_{M1} to R_{M3}) so as to provide measurement voltages (V'_{c1} to V'_{c3}), characterized in that the calibration voltage is superimposed on said output voltages for the production of said measurement currents, and in that said step of estimating the transfer functions is performed, on the basis of the separation of the calibration frequency terms in said output voltages, by polynomial approximation for said first frequencies.

3. The method as claimed in claim 2, characterized in that the calibration currents are injected onto said measurement resistors and in that the value of the variable components of said channels of the sensors is identified on the basis of the separation of the calibration frequency terms in the output voltages and the measurement voltages.

4. The method as claimed in claim 3, characterized in that the separation of the calibration frequency terms and their measurement is performed with the aid of a separate acquisition channel (G_{acq4}) multiplexed in time so as to process during a calibration cycle the measurement voltages of the sensor channels, the emission currents, the calibration channel and the output voltages of the sensor channels.

5. A device for the magnetic measurement of the position and the orientation of a mobile object with respect to a fixed structure, of the type

comprising:

- a first emitter assembly including at least two orthogonal coils (12_1 to 12_3; Bb_E) for emitting magnetic fields, integral with said fixed structure and defining a reference frame, and means of emission (100, 11_1 to 11_3, 13_1 to 13_3; R_E) for injecting predetermined currents (i_{E1} to i_{E3}) into said coils at first frequencies and constituting with said coils at least two emission channels;
- a second sensor assembly including at least two orthogonal coils (13; Bb_{d1} to Bb_{d3}) for detecting magnetic fields, integral with said mobile object, means of measurement (21 to 25, Bb_{CR}, R_M) by servocontrol loops, for producing in feedback coils (Bb_{CR1} to Bb_{CR3}) coupled to said detection coils feedback magnetic fields by injection of measurement currents (i_{c1} to i_{c3}) and for constituting with said detection coils at least two sensor channels, and means of calibration comprising a calibration channel (CNA_{cal}, Bl, 30) for elaborating at least one calibration voltage (V_{Cal}) at second frequencies;
- at least one acquisition channel (28, Bl, CAN_E; Am_1 to Am_4, F_1 to F_4, Bl, CAN) for measurements for extracting measurement values (V'_{c1N} to V'_{c3N}, V_{EN}) of said emission channels, said sensor channels and said calibration channel; and
- means of calculation and processing (60) for estimating, on the basis of said measurement values, the magnetic fields detected in the second sensor assembly and deducing therefrom the position and the orientation of said mobile object in said reference frame,

characterized in that said second frequencies are distinct from said first frequencies, in that said means of calibration are provided so as to inject calibration currents and voltages into said sensor channels so as to produce calibration measurement

values identified by their frequencies and addressed to said means of calculation by the acquisition channel or channels and in that said means of calculation and processing (60) are provided so as to estimate the transfer function of each of the sensor channels and to deduce the magnetic fields detected from said measurement values and from the inverse of said estimated transfer functions.

6. The device as claimed in claim 5, characterized in that said sensor channels each comprise a feedback coil (Bb_{CR1} to Bb_{CR3}) coiled onto the same magnetic core as the associated detection coil (Bb_{d1} to Bb_{d3}), corrector amplifier means (22, 23; 41 to 43) for generating on the basis of the signal at the terminals of the detection coil an output voltage (V_{c1} to V_{c3}), and amplifier/current generator means (24, R_s; 241 to 243, R_{s1} to R_{s3}; A_{21} to A_{23}) for elaborating a feedback current (i_c; i_{c1} to i_{c3}) injected into the associated feedback coil and a feedback current measurement resistor (R_{M1} to R_{M3}) traversed by said current so as to provide a measurement voltage (V'_{c1} to V'_{c3}), and in that said means of calibration furthermore comprise first means (44 to 46) of injecting the calibration voltage onto said amplifier/current generator means and second means (31, 51 to 53) for injecting a calibration current (i_{cal}) proportional to said calibration voltage (V_{cal}) onto said measurement resistors (R_{M1} to R_{M3}).

7. The device as claimed in claim 6, characterized in that said acquisition channels comprise first acquisition channels (G_{acq1} to G_{acq3}) for processing in continuous mode said measurement voltages respectively of each sensor channel, a sampled acquisition channel (G_{acq4}) for processing in time multiplex mode the calibration signals present in

said output voltages of the sensor channels, in the measurement voltages of these same channels and in the sum of the emission currents, and said emission currents; and means of multiplexing (55, 56) for applying said signals processed by the sampled acquisition channel onto the input of the latter.